BILATERAL **E**FFICIENCY **ST**ANDARDS FOR U.S. AND CHINESE **DATA** CENTERS

"BEST-DATA PROJECT"

CONCEPT NOTE FOR POTENTIAL PARTICIPANTS

APRIL 20, 2015

Both the U.S. and China are experiencing rapid expansions in the number and size of data centers to keep pace with their internet and cloud computing needs. In China, the number of internet users has increased 5 times since 2005. By 2014, internet penetration reached 48% of the population, with 650 million users. As an energy-intensive segment of the new digital economy, data center growth is affected by high energy costs. While energy efficiency is a promising solution, there are no common efficiency standards governing the design or operation of data centers and the associated devices and systems, and no consistent test procedures for checking compliance. Stakeholders in both countries have expressed strong interest in collaborating to improve data center energy efficiency via open standardization in the two countries.

BACKGROUND

Over the past few years, DOE has supported Lawrence Berkeley National Laboratory's (LBNL) work with China's Ministry of Industry and Information Technology (MIIT) and the data center industry from both countries in conducting trainings on improving China's data center efficiency. Use of relevant U.S. tools, such as DC Pro[1], and information on best practices have been demonstrated and shared in China. This work underpinned a new feasibility study and demonstration project funded by the U.S. Trade & Development Agency (USTDA) that is assessing energy efficiency retrofit solutions from U.S. vendors in legacy Chinese data centers and high efficiency designs for new data centers. USTDA also conducts a series of standards workshops in China, including one on data centers in 2013[2]. The U.S. Environmental Protection Agency (EPA) has been working with the China National Institute of Standardization (CNIS) on harmonizing test methods for computer servers.

DOE is looking to build upon this groundwork by working with MIIT and industry to promote open standards, test procedures, specifications, and evaluation metrics for U.S. and Chinese data centers. LBNL will work with participants in the Open Compute Project (OCP)[3] to expand its concept to China. OCP is an innovative platform started in the U.S. by global information technology companies that provides a mechanism for open and collaborative development of data center system designs and continuous improvements. OCP's open specifications, open designs, and voluntary standards (e.g. OCP Open Rack standard for computing, storage, and networking) used or produced by companies like Facebook have already yielded new combined servers and data centers up to 38% more efficient and 24% less expensive to build and run than regular state-of-the-art platforms. OCP's US Summit[4] and EU Summit showcase relevant products and services, generate quality leads, and foster partnerships among the thousands that attend.

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[1] http://datacenters.lbl.gov/dcpro
[2] http://www.ustda.gov/news/events/2013/EastAsia/China/GreenDataCentersWS.asp
[3] http://www.opencompute.org/
[4] http://www.opencompute.org/community/events/summit/ocp-us-summit-2015/

MIIT and its affiliated association have expressed a strong interest in pursuing such an approach in China. DOE and MIIT aim at recruiting a bilateral industry consortium that consists of technology providers, internet companies, data center developers, associations, and research institutions to form an open community in China that can benefit from and feed into OCP's standards and specifications.

WORK PLAN

Outputs:

a. Draft open community and energy efficiency standards proposal: a workshop with relevant U.S. and Chinese stakeholders will be convened in China this summer to brainstorm an open standard community and exchange information on existing hardware standards, specifications, and test procedures. Attendees will discuss how to apply these insights and the OCP concept in China. A new industry-led U.S.-China Open Compute Summit could be the next step to bring together ICT industrial participants and experts to discuss product innovation and business opportunities related to market-driven standards. If of interest to stakeholders, the workshop may explore metrics and criteria for evaluating green data centers. LBNL will summarize key findings and draft a proposal for consideration by DOE and MIIT on how to create a stakeholder process and develop viable strategies to facilitate the development of an OCP-style open standard community and creation of open hardware specifications in China modeled on the OCP practices.

b. MOU signings among stakeholders in both countries: cooperation opportunities between U.S. and Chinese parties will be promoted at the workshop and any formal relationships that result (e.g. business partnership for a joint project) may be considered for high-profile recognition during the prestigious U.S. – China Energy Efficiency Forum (EEF) in the fall of 2015.

c. Open community and efficiency standard(s) planning and outreach: If the open community and efficiency standard proposal is approved by DOE and MIIT, a breakout session at the EEF will be used to flesh-out the work plan among a larger audience and identify ways to link with related opportunities and resources. If the proposal requires further refinement, the EEF will be used to address outstanding issues.

Resources: Both governments will develop initial content as a basis for discussion among industry experts, convene the workshop and EEF, and provide an opportunity for recognition during the MOU signing ceremony. No funding is provided for stakeholder participation, which is likely to entail regular email exchanges, brief teleconferences every few weeks, and attendance at the workshop and EEF. It is expected that the value derived from establishing new contacts and informing the direction of the standards will merit the time and travel expenses associated with participation.

Potential Participants: MIIT, China Institute of Electronics, China Electronics Standardization Institute, Chinese internet services providers (e.g., Baidu, Alibaba, Tencent, etc.), CNIS, DOE, EPA, LBNL, OCP board membership corporations (e.g. Facebook, Microsoft, Goldman Sachs, Rackspace, Arista Networks, Intel), Green Grid, Information Technology Industry Council (ITIC), U.S.-China Energy Cooperation Program, and/or others.

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